

CLAIMS

We claim:

1. A material mixing device, said device comprising:

a housing;

a first port in said housing that receives a first container having first contents therein;

a second port in said housing that receives a second container that contains second contents to be mixed with said first contents to form a material;

a first passageway in said housing for placing said first port and said second port into fluid communication with each other, said passageway comprising a first end having a first needle and a second end having a second needle, said first needle penetrating said first container and said second container penetrating said second container; and

a movable seal in said second container that is displaced during insertion into said second port to expel said second contents under pressure through said passageway and into said second container.

2. The device of Claim 1 wherein said first contents is a lyophilized drug and said second contents is a diluent.

3. The device of Claim 2 wherein said housing comprises interlock means to prevent said second container from being engaged into said second port before said first container is inserted into said first port.

4. The device of Claim 3 wherein first and second ports are adjacent each other in said housing and wherein said interlock means comprises a pivoting bar that blocks said first port whenever said second port is vacant and which pivots out of said second port whenever said first container is engaged with said first port.

5. The device of Claim 1 wherein said first port and said second port are on opposite sides of said housing.

6. The device of Claim 1 wherein said second container also comprises a controlled volume of gas.

7. The device of Claim 6 wherein said gas is air.

8. The device of Claim 6 wherein said device does not need to be shaken to thoroughly mix said first contents and said second contents to form said material.

9. The device of Claim 6 further comprising:

a second passageway in said housing in fluid communication with said first passageway for conveying said material from said second container; and

a hydrophillic membrane in said second passageway, said hydrophillic membrane preventing the passage of said controlled volume of air into said second passageway while permitting said material to pass through.

10. The device of Claim 6 further comprising:

a second passageway in said housing, parallel with said first passageway, for conveying said material from said second container; and

a hydrophillic membrane in said second passageway, said hydrophillic membrane preventing the passage of said controlled volume of air through said second passageway while permitting said material to pass through.

11. A material mixing device, said device comprising:

a housing;

a first port in said housing that receives a first container having first contents therein;

a second port in said housing for receiving a second compressible container having second contents therein;

a first passageway in said housing for placing said first port and said second port into fluid communication with each other; and

means for compressing said second compressible container to drive out said second contents into said first container to form said material.

12. The device of Claim 11 wherein said passageway comprises a first end having a first needle and a second end having a second needle, said first needle penetrating said first container and said second needle penetrating said second compressible container.

13. The device of Claim 11 wherein said second compressible container comprises a flexible bag and wherein said means for compressing comprises a pair of rotating drums between which said flexible bag passes.

14. The device of Claim 11 wherein said first contents comprises a lyophilized drug and wherein said second contents comprises a diluent.

15. The device of Claim 13 wherein said rotating drums are operated by a rack and pinion mechanism.

16. A container pressurization device, said device comprising:

a housing;

a port in said housing for receiving a container of a liquid;

gas storage means;

a passageway for coupling said gas storage means in fluid communication with said container when said container is engaged with said port; and

activating said gas storage means to introduce a gas into said container through said passageway to pressurize the liquid contained therein.

17. The device of Claim 16 wherein said gas storage means comprises a bellows that forces air into said container.

18. The device of Claim 17 wherein movement of said container within said port compresses said bellows to force air into said container.

19. The device of Claim 17 wherein said passageway comprises a needle.

20. The device of Claim 18 wherein said passageway comprises a needle.

21. The device of Claim 19 wherein said liquid comprises a reconstituted drug for injection.

22. The device of Claim 20 wherein said liquid comprises a reconstituted drug for injection.

23. A material mixing device, said device comprising:

a housing;

a first port in said housing that receives a first container having first contents therein;

a second port in said housing that receives a second container that contains second contents to be mixed with said first contents to form a material;

a first passageway in said housing for placing said first port and said second port into fluid communication with each other, said passageway comprising a first end having a first needle and a second end having a second needle, said first needle penetrating said first container and said second needle penetrating said second container;

a second passageway for coupling a pressure source in fluid communication with said first contents; and

a third passageway for conveying said material out of said housing.

24. The device of Claim 23 wherein said pressure source is a bellows.

25. The device of Claim 23 wherein said pressure source is a syringe.

26. The device of Claim 23 wherein said pressure source is a cylinder.

27. The device of Claim 23 wherein said pressure source is a compressed air canister.

28. The device of Claim 23 wherein said pressure source is a chemical gas generator.

29. The device of Claim 23 further comprising a hydrophillic membrane in said third passageway, said hydrophillic membrane preventing the passage of said gas through said third passageway while permitting said material to pass through.

30. The device of Claim 23 wherein said first contents is a diluent.

31. The device of Claim 23 wherein said second content is a lyophilized drug.

32. The device of Claim 23 wherein said second needle is vertically-positioned and is adjustable in height.

33. The device of Claim 23 wherein said third passageway comprises a cavity and piston, said cavity including indicia thereon so that a user can operate said piston to withdraw a desired amount of said material.

34. The device of Claim 26 wherein said housing comprises interlock means to prevent said cylinder from being activated until both said first container and said second container are engaged with said first and second ports, respectively.

35. The device of Claim 34 wherein said interlock means comprises a lip at a piston end of said cylinder that is prevented from moving by an edge in a flexible wall that receives said cylinder, said flexible wall being deflected by the entry of said first and second containers into said respective first and second ports to disengage said lip from said edge.

36. The device of Claim 26 wherein said housing comprises interlock means to prevent said cylinder from re-pressurizing once said gas is injected.

37. The device of Claim 36 wherein said interlock means comprises a lip at a piston end of said cylinder that is trapped under a locking element at a completion end of the cylinder stroke which injects said gas.

38. A material mixing device, said device comprising:

a housing;

a first port in said housing that receives a first container having first contents therein;

a second port in said housing that receives a second container that contains second contents to be mixed with said first contents to form a material;

a third port in said housing that receives an air pressurization system;

a first passageway in said housing for placing said first port and said second port into fluid communication with each other, said first passageway comprising a first end having a first needle and a second end having a second needle, said first needle penetrating said first container and said second needle penetrating said second container; and

a second passageway for coupling said air pressurization in fluid communication with said first contents for forming said material under pressure.

39. The device of Claim 38 wherein said material comprises a low viscosity drug.

40. A material mixing device, said device comprising:

a housing;

a first port in said housing that receives a first container having first contents therein;

a second port in said housing that receives a second container that contains second contents to be mixed with said first contents to form a material;

a passageway in said housing that can be manually switched for placing said first port and said second port into fluid communication with each other, said passageway comprising a first end having a first needle and a second end having a second needle, said first needle penetrating said first container and said second container penetrating said second container; and

a movable seal in said second container that is displaced during insertion into said second port to expel said second contents under pressure through said passageway and into said second container.